

New claim 1
08.30.2004

- 23 -

PCT/DE03/02153
PTR427WO

Patent Claims

1. An arrangement for deflecting part, formed by a flap, of the external paneling of a motor vehicle, in particular an engine hood or a trunk flap, in the event of a crash in order, when a person situated outside the motor vehicle impacts against the deflected part, to dissipate impact energy by a movement of the part counter to the deflecting direction, having a device for
5
10
15
deflecting part of the external paneling, which device acts on at least one point of the part and which, when a person impacts against the part, permits a movement of the part counter to the deflecting direction, the application point of the deflecting device (1, 2, 3, 4, 5, 6) being provided in the region of an end (H) of the part (M), which end is assigned to the passenger cell, characterized

in that the deflecting device (1, 2, 3, 4, 5, 6) has an element (10; 10'; 20, 21; 26; 31; 43; 55; 60, 61)
20
which, upon an impact of a person against the deflected part (M), in which the impact forces (F_b , F_h) act counter to the deflecting direction, can oppose a movement of the part (M) of the external paneling counter to the deflecting direction (a) in order to
25
prevent it, and in that the deflecting device (1, 2, 3, 4, 5, 6) is controlled as a function of the time, the location and/or the direction of the impact in such a manner that, as a function of the instant of the impact and/or the location of the impact and/or the direction
30
of the impact against the deflected part (M) of the external paneling, the deflecting device (1, 2, 3, 4, 5, 6) permits a movement of the part (M) of the external paneling counter to the deflecting direction (a) or opposes such a movement, in order to prevent it.

35

2. The arrangement as claimed in claim 1, characterized in that the deflecting device (1, 2, 3,

4, 5, 6) permits a movement of the part (M) counter to the deflecting direction (a) only after a specifiable instant after the deflection of the part (M) of the external paneling.

5

3. The arrangement as claimed in claim 1 or 2, characterized in that the deflecting device (1, 2, 6) deflects the part (M) of the external paneling under the action of the pressure of a fluid, in particular of a gas.

10

- 24 -

4. The arrangement as claimed in claim 3, characterized in that the pressure of the fluid is time-controlled and preferably decreases after the deflection of the part (M) of the external paneling.

5

5. The arrangement as claimed in claim 4, characterized in that the pressure of the fluid acting on the deflected part (M) of the external paneling can be reduced by some of the fluid being discharged.

10

6. The arrangement as claimed in claim 5, characterized in that vent openings are provided for discharging fluid.

15

7. The arrangement as claimed in claim 6, characterized in that the outlet cross section of the vent openings can be controlled.

20

8. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (1, 2, 3, 6) can be triggered pyrotechnically.

25

9. The arrangement as claimed in one of claims 3 to 7 and claim 8, characterized in that the pressure is produced pyrotechnically.

30

10. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (1, 2) comprises an element (10, 21) which can be filled with fluid and, when filled, acts on the part (M) of the external paneling.

11. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (2, 6) comprises a piston (21, 61) which can act on the part (M) of the external paneling.

5

12. The arrangement as claimed in claim 3 and claim 10 or 11, characterized in that the fluid serves for filling the fillable element (10) or for moving the piston (21, 61).

10

13. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device can be locked in such a manner that it does not permit any movement of the part (M) of the external paneling counter to the deflecting direction (a) and in that the locking can be released by the impact of a body part of a person against the part (M) of the external paneling, so that, upon a further impact, the part moves counter to the deflecting direction (a).

20

14. The arrangement as claimed in claim 13, characterized in that a hook is provided for the locking.

25 15. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (2, 3, 4, 5, 6) can be moved counter to the deflecting direction (a) only upon the impact of a body part of a person within a certain region of the part (M) of the external paneling.

30

16. The arrangement as claimed in claim 15, characterized in that the region surrounds the point of the part (M) against which the deflecting device (2, 3, 4, 5, 6) acts.

35

17. The arrangement as claimed in one of the preceding

- 25a -

claims, characterized in that the deflecting device
acts

- 26 -

on the part (M) of the external paneling via an elastically or plastically deformable element (10; 20, 21; 26; 42; 55).

5 18. The arrangement as claimed in claims 16 and 17, characterized in that when a person impacts against the part (M) of the external paneling in the environment of the elastically or plastically deformable element (10; 20, 21; 26; 31; 42; 55), this element (10; 20, 21; 26; 10 31; 42; 55) executes such a movement that the part (M) of the external paneling moves counter to the deflecting direction (a).

19. The arrangement as claimed in claim 17 or 18, 15 characterized in that the deformation element is formed by a spring-elastic element (26, 42, 55).

20. The arrangement as claimed in claim 17 or 18, characterized in that the deformation element is formed 20 by a flexible coupling element (31) between the deflecting device (3) and the part (M) of the external paneling, for example in the form of a flexible traction means.

25 21. The arrangement as claimed in claim 17 or 18, characterized in that the deformation element is formed by a telescopic element (20, 21).

22. The arrangement as claimed in one of the preceding 30 claims, characterized in that the deflecting device (1, 2, 3, 4, 5, 6) is of at least partially reversible design, so that a movement of the part (M) of the external paneling counter to the deflecting direction (a) is made possible by a movement of elements of the 35 deflecting device (1, 2, 3, 4, 5, 6), which movement is opposed to the movement during deflection of the part (M).

23. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (2, 3, 4, 5, 6) can be moved counter to the

deflecting direction (a) only upon the impact of a body part of a person against the part (M) of the external paneling within a certain directional region.

5 24. The arrangement as claimed in one of claims 17 to 21 and claim 23, characterized in that the deformation element (20, 21; 26; 60, 61) can be deformed only upon an impact with a direction within the specified directional region.

10

25. The arrangement as claimed in claim 23, characterized in that at least one element (21, 41, 51) of the deflecting device (2, 4, 5), which element can be moved for the deflection of the part (M) of the external paneling, is designed and/or arranged in such a manner that the deflecting device (2, 4, 5) permits a movement of the part (M) counter to the deflecting direction (a) only upon an impact within the specified directional region.

20

26. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (4, 5) has a lever mechanism for deflecting the part (M) of the external paneling.

25

27. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (3) has a movably guided traction means (31) for deflecting the part (M) of the external paneling.

30

28. The arrangement as claimed in claim 26, characterized in that the lever mechanism has at least one lever (41, 51) which can be pivoted for the deflection of the part (M) of the external paneling.

35

29. The arrangement as claimed in claim 27, characterized in that the traction means (31) can be

- 27a -

tightened for the deflection of the part (M) of the external paneling.

30. The arrangement as claimed in claim 28 or 29, characterized in that to move the part (M) of the external paneling counter to the deflecting direction (a), the lever (41, 51) is pivoted or the traction
5 means (31) is subjected to a load counter to its tensioning.

31. The arrangement as claimed in claims 23 and 30, characterized in that the pivoting of the lever (41,
10 51) or the movement of the part (M) of the external paneling counter to the tensioning of the traction means (31) is possible only upon an impact against the part (M) of the external paneling within the specified directional region.

15 32. The arrangement as claimed in claims 11 and 23, characterized in that a movement of the piston (21, 61) counter to the deflecting direction (a) can be triggered only upon an impact against the part (M) of
20 the external paneling within the specified directional region.

33. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (4)
25 is coupled to an elastic element (42) which pretensions the deflecting device (4) in the deflecting direction (a).

34. The arrangement as claimed in claim 33,
30 characterized in that a locking element (43) which prevents a deflection of the part (M) of the external paneling by the deflecting device (4) is provided.

35. The arrangement as claimed in claim 34,
35 characterized in that the locking can be canceled by the impact of a person against the vehicle, for example against the part (M) of the external paneling.

- 29 -

36. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (4, 5) can be activated by a first impact of a person against the vehicle, so that the part (M) of the external paneling is deflected.

37. The arrangement as claimed in claim 36, characterized in that the force produced during the impact acts on the deflecting device (5), so that the latter is activated.

38. The arrangement as claimed in one of the preceding claims, characterized in that the deflecting device (1, 2, 3, 6) can be activated as a function of the signal of a sensor coupled to the deflecting device.

39. The arrangement as claimed in one of the preceding claims, characterized in that the part (M) of the external paneling is formed by a flap of the motor vehicle.

40. The arrangement as claimed in claim 39, characterized in that the flap (M) is an engine hood or a trunk flap.

41. The arrangement as claimed in claim 40, characterized in that the application point of the deflecting device (1, 2, 3, 4, 5, 6) is provided in the region of that end (H) of the flap (5) which faces the passenger cell.